

Amendments to the Claims:

This listing of the claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1 (Currently Amended): A fuel cell system which generates electricity by supplying fuel gas and oxidant gas to a fuel cell stack comprising:

a fuel cell stack comprising

a plurality of unit cells, each unit cell including a membrane electrode assembly to generate electricity from a reaction between fuel gas and oxidant gas forming water as a by-product, the membrane electrode assembly comprising a polymer electrolyte membrane and two electrodes on both sides of and adjacent to the polymer electrolyte membrane,

a fuel cell stack anode electrically connected to one of the two electrodes, and

a fuel cell stack cathode electrically connected to the other of the two electrodes,

wherein each unit cell is immediately adjacent another unit cell;

a rechargeable battery electrically connected to the fuel cell stack in a parallel connection in which an anode of the battery is electrically connected to the anode of the fuel cell stack, and a cathode of the battery is electrically connected to the cathode of the fuel cell stack, the battery supplies current to the unit cells of the fuel cell stack through the parallel connection to allow the unit cells to electrolyze water therein; and

a controller programmed to:

determine whether or not the fuel cell stack is generating electricity, and

supply current to the unit cells of the fuel cell stack from the battery through the parallel connection to allow the unit cells to electrolyze water therein, when generation of electricity by the fuel cell stack is terminated, and supply current from the unit cells through the parallel connection to charge the battery when the fuel cell stack generates electricity.

2 (Cancelled)

3 (Previously Presented): The fuel cell system according to claim 1, wherein the fuel cell stack comprises a pair of end plates and at least one unit cell containing a gas diffusion layer in contact with a membrane electrode assembly which is constructed of the polymer electrolyte membrane enclosed between the two electrodes, wherein said at least one unit cell is stacked between the end plates.

4 (Previously Presented): The fuel cell system according to claim 1, wherein the battery is configured for being charged by electric power from a generator or the fuel cell stack.

5 (Currently Amended): A motor vehicle comprising a fuel cell system which generates electricity by supplying fuel gas and oxidant gas to a fuel cell stack comprising:

the fuel cell stack comprising

a plurality of unit cells, each unit cell including a membrane electrode assembly to generate electricity from a reaction between fuel gas and oxidant gas forming water as a by-product, the membrane electrode assembly comprising a polymer electrolyte membrane and two electrodes on both sides of and adjacent to the polymer electrolyte membrane,

a fuel cell stack anode electrically connected to one of the two electrodes, and

a fuel cell stack cathode electrically connected to the other of the two electrodes,

wherein each unit cell is immediately adjacent another unit cell;

a rechargeable battery electrically connected to the fuel cell stack in a parallel connection in which an anode of the battery is electrically connected to the anode of the fuel cell stack, and a cathode of the battery is electrically connected to the cathode of the fuel cell stack, the battery supplies current to the unit cells of the fuel cell stack through the parallel connection to allow the unit cells to electrolyze water therein; and

a controller programmed to:

determine whether or not the fuel cell stack is generating electricity, and

supply current to the unit cells of the fuel cell stack from the battery through the parallel connection to allow the unit cells to electrolyze water therein, when generation of electricity by the fuel cell stack is terminated, and supply current from the unit cells through the parallel connection to charge the battery when the fuel cell stack generates electricity.

6 (Currently Amended): An automobile comprising a fuel cell system which generates electricity by supplying fuel gas and oxidant gas to a fuel cell stack comprising:

the fuel cell stack comprising

a plurality of unit cells, each unit cell including a membrane electrode assembly to generate electricity from a reaction between fuel gas and oxidant gas forming water as a by-product, the membrane electrode assembly comprising a polymer electrolyte membrane and two electrodes on both sides of and adjacent to the polymer electrolyte membrane,

a fuel cell stack anode electrically connected to one of the two electrodes, and

a fuel cell stack cathode electrically connected to the other of the two electrodes,

wherein each unit cell is immediately adjacent another unit cell;

a rechargeable battery electrically connected to the fuel cell stack in a parallel connection in which an anode of the battery is electrically connected to the anode of the fuel cell stack, and a cathode of the battery is electrically connected to the cathode of the fuel cell stack, the battery supplies current to the unit cells of the fuel cell stack through the parallel connection to allow the unit cells to electrolyze water therein; and

a controller programmed to:

determine whether or not the fuel cell stack is generating electricity, and

supply current to the unit cells of the fuel cell stack from the battery through the parallel connection to allow the unit cells to electrolyze water therein, when generation of electricity by the fuel cell stack is terminated, and supply current from the unit cells through the parallel connection to charge the battery when the fuel cell stack generates electricity.

7 (Withdrawn): A fuel cell system which generates electricity by supplying fuel gas and oxidant gas to a fuel cell stack comprising:

a fuel cell stack;

a DC power supply comprising at least one of a generator and battery; and

a means of controlling a flow of current to the fuel cell stack, wherein said means is equipped with a means of measuring the current flowing to the fuel cell stack while it is flowing, and said means controls a voltage impressed on the fuel cell stack so that the current flowing to the fuel cell stack reaches a predetermined amperage.

8 (Withdrawn): The fuel cell system according to claim 7, wherein the means of controlling the flow of said current to the fuel cell stack is connected to each unit cell that composes said fuel cell stack.

9 (Withdrawn): The fuel cell system according to claim 8, wherein said current can be independently supplied to at least one or more of the unit cells that compose the fuel cell stack.

10 (Withdrawn): The fuel cell system according to claim 7, wherein said current flows to a unit cell that contacts the end plate and to a continuous series of at least one and at most ten unit cells.

11 (Withdrawn): The fuel cell system according to claim 7, further comprising a means of shutting off the current flow to the fuel cell stack that shuts off the flow of said current to the fuel cell stack when the duration of said current flow to the fuel cell stack reaches a predetermined time.

12 (Withdrawn): The fuel cell system according to claim 11, further comprising a means of measuring a flow rate of fuel gas in gas discharged from a fuel gas discharge port of the fuel cell stack, wherein the means of shutting off the current flow to the fuel cell stack shuts off the flow of said current to the fuel cell stack if it determines that the flow rate of fuel gas falls below a value that is measured before supplying said current to the fuel cell stack.

13 (Withdrawn): The fuel cell system according to claim 11, further comprising a means of measuring humidity of a gas discharged from a fuel gas discharge port or an oxidant gas discharge port of the fuel cell stack, wherein the means of shutting off the current flow to the fuel cell stack shuts off the flow of said current to the fuel cell stack if it determines that the humidity of the gas discharged from said fuel gas discharge port or said oxidant gas discharge port falls below a predetermined value.

14 (Withdrawn): The fuel cell system according to claim 11, further comprising a means of measuring moisture content of a polymer electrolyte membrane in the fuel cell stack, wherein the means of shutting off the current flow to the fuel cell stack shuts off the flow of said current to the fuel cell stack if it determines that the moisture content of said polymer electrolyte membrane falls below a predetermined value.

15 (Withdrawn): The fuel cell system according to claim 14, wherein the means of measuring moisture content of a polymer electrolyte membrane in the fuel cell stack measures resistance of at least some unit cells in the fuel cell stack, and calculates the moisture content based on the resistance of the unit cells.

16 (Withdrawn): The fuel cell system according to claim 11, wherein when said current flows to the fuel cell stack, the fuel gas and oxidant gas inside said fuel cell stack are simultaneously discharged from the fuel cell stack.

17 (Withdrawn): The fuel cell system according to claim 16, further comprising means of burning the fuel gas discharged from the fuel cell stack.

18 (Withdrawn): A motor vehicle comprising the fuel cell system of claim 7.

19 (Withdrawn): The motor vehicle according to claim 18, wherein the motor vehicle is an automobile.

20 (Withdrawn): A method of removing water from a fuel cell system, said fuel cell system comprising:

a fuel cell stack having at least one unit cell,

a DC power supply comprising at least one of a generator and battery, and

a programmable controller, comprising the steps of:

generating electricity from the fuel cell stack by supplying fuel gas and oxidant gas to the fuel cell stack;

terminating the generation of electricity from the fuel cell stack;

determining that the generation of electricity by the fuel cell stack has terminated using said programmable controller; and

using said programmable controller to supply current to the fuel cell stack from the DC power supply.

21 (Withdrawn): The method according to claim 20, further comprising charging said battery with electric power from said generator or said fuel cell stack.

22 (Withdrawn): The method according to claim 20, further comprising:

measuring the flow of said current to the fuel cell stack; and

controlling the flow of said current to the fuel cell stack.

23 (Withdrawn): The method according to claim 22, wherein the flow of said current to the fuel cell stack reaches a predetermined amperage by controlling a voltage impressed on the fuel cell stack.

24 (Withdrawn): The method according to claim 22, wherein the flow of said current to at least one or more unit cells in the fuel cell stack is independently controlled.

25 (Withdrawn): The method according to claim 20, further comprising shutting off the flow of said current when the duration of the current flow to the fuel cell stack reaches a predetermined time.

26 (Withdrawn): The method according to claim 20, further comprising:

measuring a flow rate of fuel gas in a gas discharged from a fuel gas discharge port of the fuel cell stack; and

shutting off the flow of said current to the fuel cell stack if the flow rate of the fuel gas falls below a value that is measured before supplying said current to the fuel cell stack.

27 (Withdrawn): The method according to claim 20, further comprising:

measuring humidity of a gas discharged from a fuel gas discharge port or an oxidant gas discharge port of the fuel cell stack; and

shutting off the flow of said current to the fuel cell stack if the humidity of the gas discharged from said fuel gas discharge port or said oxidant gas discharge port falls below a predetermined value.

28 (Withdrawn): The method according to claim 20, further comprising:

measuring moisture content of a polymer electrolyte membrane in the fuel cell stack; and

shutting off the flow of said current to the fuel cell stack if the moisture content of the polymer electrolyte membrane falls below a predetermined value.

29 (Withdrawn): The method according to claim 28, wherein the step of measuring a moisture content of a polymer electrolyte membrane in the fuel cell stack comprises measuring electrical resistance of at least some of the unit cells in the fuel cell stack; and calculating the moisture content based on the resistance of said unit cells.

30 (Withdrawn): The method according to claim 20, further comprising simultaneously discharging fuel cell gas and oxidant gas remaining in the fuel cell stack.

31 (Withdrawn): The method according to claim 30, further comprising burning fuel gas discharged from the fuel cell stack after terminating the generation of electricity from the fuel cell stack.